


State of Oregon  
Department of Environmental Quality

Memorandum

Date: April 2, 2013

**To:** Emerald Laija  
Environmental Scientist  
U.S. EPA Region 10

**From:** Fredrick Moore   
Permit Writer  
Eastern Region Hazardous Waste Program

**Subject:** Transmittal of ARCADIS Comments on the Courtesy Final Draft Fourth  
CERCLA Five-Year Review Report  
Lockheed Martin The Dalles Facility • ORD 052 221 025 • ECSI #72

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Emy,

Attached to this transmittal memo is an ARCADIS memo commenting on the draft CERCLA 5-Year review along with a table with errors. As you know, I asked ARCADIS to review the report for factual accuracy. As you see, ARCADIS wanted to further state their opinion on the Region 10 conclusions and draft recommendations. Because they were not invited to comment, they forwarded their memos to DEQ.

As a co-permittee and operator of the site, I think it is appropriate they can submit comments for someone to consider their viewpoint. As their memo is now an Oregon public record, I can assume Region 10 would like a copy and therefore I am forwarding it to you.

However, DEQ does not offer its opinion to the degree of how much it agrees or disagrees with ARCADIS's comments. Further, ARCADIS's comments were not used in the comments to come from DEQ.



ARCADIS  
1610 B Street  
Suite 100  
Helena  
Montana 59601  
Tel 406.449.7001  
Fax 406.449.3063

**MEMO**

To:  
Fredrick Moore  
Oregon Department of Environmental Quality  
475 NE Bellevue Suite 110  
Bend, OR 97701

Copies:  
Marcy Kirk, ODEQ

From:  
Lynden Peters

Date:  
March 29, 2013

ARCADIS Project No.:  
GP000677.2012

Subject:  
Five-Year Review Report - Technical Basis Review  
Lockheed Martin Site – The Dalles, Oregon  
ORD 052 221 025

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**Introduction**

The Oregon Department of Environmental Quality has provided a courtesy copy of the United States Environmental Protection Agency (EPA), Region 10, final draft of the Fourth Five-Year Review Report for the Lockheed Martin Corporation The Dalles Facility Formerly Martin Marietta Company Reduction Facility, The Dalles, Wasco County, Oregon. The report identifies five issues with recommendations and concludes that the site remedy is not functioning as intended, that protectiveness cannot be determined until further information is obtained, and that as such EPA must make a Protectiveness Deferred finding.

This memo presents a summary of the review of the EPA's final draft Five- Year Review Report and presents areas where ARCADIS, U.S., Inc. (ARCADIS) takes exception to the conclusions EPA has drawn. The following issues and recommendations were the focus of the review report:

Issues Identified in 5-Year Review	EPA Recommendations and Follow-up Actions
1. The ACLs identified in the ROD are higher than MCLs	Apply MCLs at the Site through an ESD
2. The effectiveness of biological treatment of	Evaluate alternative methods for cyanide present in leachate from CERCLA landfill. Based on the

cyanide is not fully understood.	evaluation, a different method will be implemented to treat leachate.
3. Groundwater movement and contaminant flow and transport are not fully understood.	Implement a comprehensive groundwater investigation on a Site-wide basis.
4. Ecological receptors are entering the Scrubber Sludge Ponds area.	Modify fencing to prevent entrance of ecological receptors to the Site. Conduct soil sampling to determine integrity of soil cover.
5. Uncertainty around protection of future land owners of the site and surrounding area.	Reestablish institutional controls to prevent use of groundwater to protect surrounding current and potential future land owner and downgradient.

This review is an opportunity for ARCADIS to formally submit our comments in rebuttal to the five issues identified in the EPA report.

#### Issue #1

##### *The ACLs identified in the ROD are higher than MCLs*

"The federal MCLs for drinking water for fluoride and sulfate 4.0 mg/L and 250 mg/L, respectively. Guidance issued by EPA in 2005 clarified that MCLs rather than ACLs were to be used for CERCLA remedies, particularly when the affected groundwater is a potential drinking water source or if it discharges to surface water. Based on the guidance, EPA determined a need to replace ACLs at the Site with MCLs for fluoride and sulfate and intends to accomplish this action through an ESD." (5 Year Review Report, page 27)

##### Technical basis from report

"In 2005, EPA issued guidance that clarified policy on the use of alternate concentration limits (ACLs) in CERCLA cleanup. CERCLA Section 121(d) generally provides that remedial actions shall meet applicable or relevant and appropriate requirements (ARARs), unless those requirements are waived pursuant to section 121(d)(4) under appropriate site-specific circumstances. Section 121(d)(2)(B)(ii) also addresses ACLs and limitations concerning their use by stating a process for establishing ACLs to those otherwise applicable for hazardous waste constituents in groundwater under subparagraph (A) may not be used to establish applicable standards if the process assumes a point of human exposure beyond the boundary of the facility.....At the Site, the S aquifer is identified as discharging to the Columbia River. This discharge



point is located beyond the boundary of the Site and acts as a potential point for human exposure. Based on this information, EPA has identified a need for an ESD to change the ACLs to MCLs." (5 Year Review Report, page 38)

**Possible discrepancies in guidance and historic documents**

However, EPA has previously clearly stated circumstances in which the establishment of ACLs are appropriate and protective:

Section 121(b)(1) requires that remedial actions be protective of human health and the environment. In addition to that independent requirement, Section 121(d) generally provides that remedial actions shall meet applicable or relevant and appropriate requirements (ARARs), unless those requirements are waived pursuant to section §121(d)(4) under appropriate site-specific circumstances.<sup>2</sup> Section 121(d)(2)(B)(ii) also addresses ACLs and limitations concerning their use, as follows:

(ii) For the purposes of this section, a process for establishing alternate concentration limits to those otherwise applicable for hazardous constituents in groundwater under subparagraph (A) may not be used to establish applicable standards under this paragraph if the process assumes a point of human exposure beyond the boundary of the facility, as defined at the conclusion of the remedial investigation and feasibility study, except where-

(I) there are known and projected points of entry of such groundwater into surface water; and

(II) on the basis of measurements or projections, there is or will be no statistically significant increase of such constituents from such groundwater in such surface water at the point of entry or at any point where there is reason to believe accumulation of constituents may occur downstream; and

(III) the remedial action includes enforceable measures that will preclude human exposure to the contaminated groundwater at any point between the facility boundary and all known and projected points of entry of such groundwater into surface water then the assumed point of human exposure may be at such known and projected points of entry. (EPA 2005)

These same requirements (Section 121(d)(2)(B)) are also present in the ROD as reasons ACLs are appropriate:

From the EPA Superfund Record of Decision (ROD) for the Martin Marietta site:

"Projected points of entry: In general, the constituents of concern in groundwater at the site have been characterized as to their vertical and horizontal extent. The constituents of concern have primarily been identified in the uppermost aquifer at the site (S-aquifer) which is not currently used for water supply purposes in the area, is not really extensive, and is of low productivity and thus not likely to be utilized in the future for water supply purposes. Groundwater in the S-aquifer flows toward, and discharges to the Columbia River **which borders the MMRF site**. The Columbia River is extremely deep adjacent to the site, and there is essentially no potential for underflow from the S-aquifer." (see EPA Superfund ROD Martin Marietta Aluminum Co. page 14 for description of compliance with II and III)

#### **Response to Issue #1**

ACLs were established in the ROD as part of the Consent Decree. The conclusion that ACLs should be eliminated for the Site is a new conclusion that is not based on any changed condition, new information, or update to the conceptual site model. Since the ROD was written, the Site boundaries have changed such that the site no longer abuts the river, but the understanding of the discharge of the S aquifer to surface water has not changed. Water quality in the S aquifer has improved overall, with discharge to the Columbia River representing a minuscule contribution to a large flow. Also, there is no data showing that there is a measurable or statistically significant increase in hazardous constituents in groundwater. The issue is not substantiated and the recommendation to apply MCLs through an ESD appears to be inappropriate to the Site.

#### **Issue #2**

##### ***The effectiveness of biological treatment of cyanide is not fully understood.***

"In January 2007, ODEQ approved a plan that outlined the operation and maintenance, monitoring, and reporting associated with a remedy change from thermal to bioremediation treatment of cyanide at the CERCLA landfill. EPA has determined that the effectiveness of biotreatment of cyanide cannot be demonstrated and that a new treatment method is required." (5 Year Review Report, page 22)

#### **Response to Issue #2**

Biologic treatment of leachate generated at the CERCLA landfill began in March 2002 with addition of a carbon source and nutrients to stimulate biological activity within the leachate collection system (LCS). Carbon was also added directly to the CERCLA tank. Early nutrient applications also included spraying nutrients on the surface of the CERCLA landfill but later dosing directly into the LCS was so successful that this application method was stopped. In December 2004, the biochemical treatment process was enhanced by initiation of a drip dosing system that meters organic carbon to the LCS and manual dosing of nutrients was initiated directly into Manholes 2 and 3 during February 2005. The dosing volumes are calculated based on fluctuations in the flow rates within the LCS. Due to the success of the in-LCS



treatment program, surface applications were discontinued following the October 22, 2007 application, and the CERCLA tank is now only dosed as needed based on analytical results. Treated effluent from the CERCLA tank is discharged to the Columbia River under NPDES permit number OR0001708. All pre-discharge analytical results from tank samples have met the 0.1 mg/L WAD cyanide requirement over the entire 11-year use of biologic treatment for cyanide for CERCLA Landfill leachate.

Given the eleven years of success for biologically mediated cyanide destruction for the CERCLA Landfill leachate, the method has proven itself. The identification of the effectiveness of biologic treatment as being not fully understood and therefore requiring implementation of a different treatment method is not substantiated. The need for replacement of the biologic treatment of cyanide in the CERCLA landfill leachate is not indicated by system performance. Every batch discharge sample collected previous to a discharge event has been within compliance limits for discharge; 0.1 mg/L WAD cyanide, which is one half the MCL for drinking water. Since 2007, samples collected from Lift Station #1 have consistently been below the 0.1 mg/L required to discharge through the NPDES permit outfall. This record of data is presented in the long term groundwater monitoring reports submitted twice a year to the agencies. It is consistent evidence that the biotreatment method is effective.

### **Issue #3**

#### ***Groundwater movement and contaminant flow and transport are not fully understood.***

"EPA has identified a lack of understanding of the groundwater movement and contaminant transport on the Site. EPA has also identified the need for a Site-wide comprehensive groundwater investigation to be conducted at the Site." (5 Year Review Report page 29)

#### **Technical data reviewed by EPA**

Sites Figures 5-7 of 2011 Semiannual RCRA and Annual CERCLA Report.

Well MW-29S – historically fluoride has exceeded the MCL (4 mg/L) and continued to be slightly over the MCL from 2006-2010. Since 2010, fluoride levels in MW-29S have decreased to below the 4 mg/L MCL. Historically, sulfate values have been above the SMCL of 250 mg/L. Between 2010 and 2012, sulfate values in this well have been between 200 and 250 mg/L.

MW-38S – historically exceeded fluoride MCL since 2005 and levels continue to fluctuate around the MCL value.

#### **Conclusions from report**

*The S aquifer is thought to be separated from the underlying A aquifer by a low-permeability zone, however, uncertainty exists regarding the extent of communication between the S and A aquifers. (5 Year Review Report, page 16)*

**Failure to Substantiate** – No additional details were provided.

*Limited groundwater monitoring data indicates that groundwater quality is static (5 Year Review Report, page 29)*

**Failure to Substantiate** – Annual groundwater monitoring data from across the site indicates concentrations of contaminants have decreased since 2005 and there are only two wells which currently approach and sometimes exceed the MCL (MW-29S – sulfate, MW-38S – fluoride).

*There is no clear indication of significant impacts from the CERCLA landfill leachate to the S or A aquifers. However, insufficient data exists to fully understand groundwater at the Site. (5 Year Review Report, page 29)*

**Failure to Substantiate** – No basis was made to support why and what is missing from the current understanding and monitoring network of groundwater at the Site.

### **Response to Issue #3**

It appears that EPA may consider the current groundwater monitoring network to be inadequate to monitor and characterize conditions across the entire former Northwest Aluminum site area. The current CERCLA Landfill, RCRA Landfill, and Scrubber Sludge Ponds groundwater monitoring well networks were not designed or intended to monitor or characterize the entire smelter site; they monitor groundwater conditions for the three waste management units identified in the ROD and for this task they are adequate. The hydrogeology and groundwater flow and contaminant transport was characterized for the entire smelter site during the Remedial Investigation using sixty five monitoring wells, some of which became part of the long term monitoring program (Geraghty & Miller 1988). As the condition of shallow groundwater improved and impacts to the deeper aquifers did not develop, the number of monitoring wells was reduced and refined to the number in use today. A "site-wide groundwater investigation" is not warranted in the current context of water quality, landfill operation and maintenance.

### **Issue #4**

***Ecological receptors are entering the Scrubber Sludge Ponds area.***

"The Scrubber Sludge Ponds soil cover is in place; however, EPA is unable to determine if the cover is functioning as intended. Monitoring well MW-29S at times shows a level of fluoride above the MCL of 4.0



mg/L although below the alternate concentration limit of 9.7 mg/L. An ESD to replace the ACLs with MCLs is necessary. Deer were able to enter the area in late 2012. Fencing around the Scrubber Sludge Ponds needs to be modified to prevent human or ecological receptors from entering the area. Soil sampling needs to be conducted to determine the effectiveness of the soil cover." (5 Year Review Report, page 37)

#### **Response to Issue #4**

The implication that the fluoride concentrations in MW-29S may somehow be connected to the failure of the soil cover is unsubstantiated by the groundwater data. Fluoride concentrations since 1993 have been exhibiting a downward trend. This trend has continued through the most recent sampling event with fluoride concentrations in MW-29S at the lowest since 2006.

Staff of the Oregon Department of Fish and Wildlife visited the Scrubber Sludge Pond area in October of 2012 and refused to consider removing deer from the enclosure after determining that their presence was a non-issue (Pers. Comm. Mike Moore, OFW, October 8, 2012). Anecdotal evidence of long-time deer use and the presence of small animal burrows indicate that several species of mammals as well as birds make use of the protected Russian olive habitat which the Scrubber Sludge Ponds have become. The 1988 Risk Assessment (Clement Associates 1988) stated that an evaluation of the potential impacts from soils, sediments and airborne dusts were not expected to pose adverse health effects under any of the exposure scenarios evaluated. In addition, the current exposures to carcinogenic chemicals (i.e., PAHS and arsenic in site study areas, are not expected to post unacceptable health risks. (Clement Associates, page B-232.

#### **Issue #5**

##### ***Uncertainty around protection of future land owners of the site and surrounding area.***

"...improve long-term institutional controls against use of groundwater to protect surrounding and potential future land owners and down-gradient receptors. These improvements include listing Lockheed Martin on deeds for all parcels of property retained by Lockheed, updating the survey plat, and identifying deed restrictions on-site." (5 Year Report Review, page 41)

#### **Response to Issue #5**

The Lockheed Martin waste management areas have been annexed into the City of The Dalles. The City has a restriction on the installation of water wells within the public water system service area. In addition



all property that was formerly part of the aluminum smelter site has deed restrictions for the installation of water wells. Lockheed Martin and ODEQ recently verified the presence of institutional controls attached to property deeds as part of the 104(e) response to EPA correspondence in July 2012.

Factual Errors to the Five-Year Review Report

The Executive Summary of the document repeats several errors that are made in the body of the Report:

Comment Number	Section Number	Page Number and Paragraph	Passage from Five-Year Review Report that is in Error	Comment/Correction for Error in Five-Year Review Report
ARC001	Exec Summary	8, ¶2	Bioremediation treatment of cyanide replaced thermal treatment for the CERCLA landfill leachate in 2007 through a permit modification to the RCRA Permit.	Biotreatment replaced thermal treatment in 2002 under a pilot program, modified to batch discharge in 2005, and codified in 2007 through a permit modification to the RCRA Permit. Since the beginning of the remediation at The Dalles site, USEPA has been kept informed of proposed actions and actions taken at the site by being copied on memoranda, correspondence and emails and by being invited to participate and sometimes participating in meetings. USEPA has always been given the opportunity to express concerns or state objections about the remediation. When concerns have been raised, they have been addressed. USEPA, despite its up-to-date knowledge and opportunities to state concerns and objections about biotreatment since 2002, never stated its current concerns until now.
ARC002	Exec Summary	8, ¶5	Given the incomplete understanding of groundwater at the site,	This statement is not correct. The hydrogeology and groundwater flow system was characterized during and documented in the RI/FS. 24 years of subsequent groundwater monitoring data confirms the conceptual site model in the areas of the waste management units.
ARC003	Sec II	12, ¶1	In September 1986, Martin Marietta leased a portion of the property to <i>Northwest Aluminum Specialties, Inc.</i>	Should read <i>Northwest Aluminum Company</i> . Northwest Aluminum Specialties, Inc. is an entirely separate and different business from Northwest Aluminum Company.
ARC004	Sec II	14, Table 1	Many significant Site Events have been left out of Table 1	Revise Table 1 to reflect all significant Site Events including leasing and selling the aluminum smelter to NWA, instituting biologic treatment for cyanide in the CERCLA

				Landfill LCS, permit modifications, closure and demolition of the aluminum smelter and remediation of the smelter site.
ARC005	Sec III	15, ¶2	A golf course, <i>rodeo grounds</i> , a railroad right-of-way and open land are within the footprint of the Site.	The rodeo grounds and the City of The Dalles Municipal Landfill were never part of the Site, but are located to the south of the Site.
ARC006	Sec III	15, ¶3	In 1990, Martin Marietta Company sold much of the real property within the footprint of the Site to <i>Northwest Aluminum Specialties, Inc.</i> ,	Should read <i>Northwest Aluminum Company</i>
ARC007	Sec III	16, ¶4	The scrubber water was directed to the Recycle Pond located at the south end of the property via the Discharge Channel. The pond was constructed as a settling basin for the wastewater and was designed to recycle water back to the plant for reuse.	The Recycle Pond was not constructed as a settling pond for scrubber sludge. The Recycle Pond was designed and used for settling sediments from stormwater.
Comment Number	Section Number	Page Number and Paragraph	Passage from Five-Year Review Report that is in Error	Comment/Correction for Error in Five-Year Review Report
ARC008	Sec III	16 ¶6	Much of this waste material was buried in a landfill in the northern part of the site and resulted in groundwater and soil contamination.	This is not a correct statement. Waste materials were stored in the northern part of the site, but were not "buried in a landfill". There are no indications that the CERCLA and RCRA Landfills have resulted in groundwater and soil contamination
ARC009	Sec IV	19, Table 2	Lists Groundwater Contaminant Limits for Free/WAD CN for the A and B aquifers as 220 mg/L	Groundwater Contaminant Limits for Free/WAD CN for the A and B aquifers are 0.22 mg/L
ARC010	Sec IV	20, ¶5	Average production rates are about 66,000 gallons per month, but can range up to 300,000 gallons per month during the rainy periods from December to March.	Maximum CERCLA Landfill monthly discharge for the period of record is 160,000 gallons, during March of 2009.
ARC011	Sec IV	21, ¶1	After 2007, batch treatments continued to occur in the tank <i>and LCS system</i> .	Carbon dosing for biologic treatment in the CERCLA Landfill LCS occurs on a continuous basis, adjusted relative to LCS



				flow volume.
ARC012	Sec IV	22, ¶1	EPA has determined that the effectiveness of biotreatment of cyanide cannot be demonstrated and that a new treatment method is required.	This statement is not correct. The use of biotreatment of cyanide has been demonstrated to be effective at the CERCLA Landfill for the last 11 years. For example, samples taken from well MW-5S in 1990 indicated a Free/WAD cyanide concentration of 3.71 mg/L. By 2000, the concentration was reduced to 0.15 mg/L and by 2004 to <0.005 mg/L. Similarly, samples from well MW-27S have shown a steady decline from 0.47 mg/L (1991) to 0.232 mg/L (2005) to 0.048mg/L (2012).
ARC013	Sec IV	23, ¶2	Deed restrictions were implemented when Martin Marietta property was sold to <i>Northwest Specialties Aluminum, Inc.</i> in 1990.	Should read <i>Northwest Aluminum Company</i>
ARC014	Sec IV	23, ¶2	Since the records office may not be readily available to all potential future land owners, the deed restriction is not a reliable institutional control.	This statement is not correct. The entire site record is stored and is available to the public at the Oregon Department of Environmental Quality office in The Dalles, Oregon. Furthermore, the office of the County Assessor of Wasco County is a frequently cited legal repository with experienced staff available to search for documents.
ARC015	Sec V	25, ¶4	EPA has determined that the effectiveness of biotreatment of cyanide cannot be demonstrated and that a new treatment method is required.	This statement is not correct. The use of biotreatment of cyanide has been demonstrated to be effective at the CERCLA Landfill for the last 11 years.
ARC015	Sec V	25, ¶4	Because groundwater is not understood at the Site, a Site-wide comprehensive groundwater investigation is needed and additional groundwater wells and increased monitoring intervals of existing wells is anticipated.	This statement is not correct. The hydrogeology and groundwater flow system was characterized during and documented in the RI/FS. Since the RI/FS set forth the conceptual site model in the areas of each of the waste management units in 1988, the site has been carefully investigated. The results of ongoing groundwater monitoring have been consistent with and confirmed the conceptual site model described in the RI/FS, in particular

				semi-annual groundwater monitoring reports documenting compliance at the CERCLA and RCRA landfills since 2002. The RI/FS and each of these reports were provided to the EPA at the time of their issuance.
ARC016	Sec V	27, ¶1	Monitoring wells MW-3 and MW-4 in the Unloading Area should be sampled annually to delineate groundwater above the MCLs at the Site is not resolved. MW-3 and MW-4 have not been sampled annually.	Monitoring wells MW-3 and MW-4 were sampled in September 2005. Groundwater analytical results were below detection for WAD cyanide and fluoride and sulfate was 35.0 and 52.5 mg/L ; well below MCLs.
ARC017	Sec VI	29, ¶1	EPA has identified a lack of understanding of the groundwater movement and contaminant transport on the Site.	This statement is not correct. The hydrogeology and groundwater flow system was characterized during and documented in the RI/FS. 24 years of subsequent groundwater monitoring data confirms the conceptual site model in the areas of the waste management units.
ARC018	Sec VI	29, ¶6	The limited groundwater monitoring data indicates that groundwater quality is static.	Groundwater data for the waste unit monitoring networks indicate static conditions for non-impacted, downgradient wells, indicating that landfill leachate is not being released or impacting groundwater. Data from wells that were impacted prior to construction and closure of the waste management units have exhibited decreasing trends for constituents of concern, generally indicating attenuation of residual contamination at the site.
ARC019	Sec VI	36, ¶1	ODEQ centered its inspection of the Site on the units owned by Lockheed Martin.	If the sentence is a statement of fact it is correct. If the sentence is intended to qualify the site inspection or suggest that the site inspection was less than adequate, it is not correct. Site inspection is a formal process that is designed to be focused on the waste management units.
ARC020	Sec VI	36, ¶2	The air/gas sampling was not yet completed at the time of this review.	This statement is not correct. The scope of work for air/gas monitoring was completed in September 2012 and a final report was submitted to Region 10 EPA in October 2012.
ARC021	Sec VII	37, ¶3	The change from a thermal method to	This statement is the <u>first</u> indication in the 11-years of use



			biotreatment is not supported by EPA.	<p>of biotreatment for cyanide that EPA is opposed to or not approving of this effective, innovative, sustainable, and low cost method for cyanide destruction. EPA has lauded this application in the past, but now suddenly appears to have concerns related to this treatment methodology, although those concerns are not specified and do not reflect the consistent attainment of regulatory discharge requirements. ARCADIS provided the agencies exhaustive and thorough references to the effective use of biological treatment of cyanide during the pilot testing phase of Permit Modification. A couple of the references are noted here:</p> <p>Ebbs, S.E., Wong-Chong, G.M., Bond, B.S., Bushey, J.T., and Neuhauser, E.F. 2006. Biological Transformation of Cyanide in Water and Soil. In Dzombak, D.A., Ghosh, R.S., and Wong-Chong, G.M. (eds.) Cyanide in Water and Soil: Chemistry, Risk, and Management. New York: CRC Taylor and Francis. pp. 93-121.</p> <p>Ghosh, R.S., Dzombak, D.A., and Wong-Chong, G.M. 2006. Physical and Chemical Forms of Cyanide. In Dzombak, D.A., Ghosh, R.S., and Wong-Chong, G.M. (eds.) Cyanide in Water and Soil: Chemistry, Risk, and Management. New York: CRC Taylor and Francis. pp. 15-23</p> <p>Gillow, J., May 16, 2008. "Evaluation of Cyanide Analyses for Landfill KO88," 6 pp.</p>
ARC022	Sec VI	37, ¶6	The limited groundwater monitoring data indicates that groundwater quality is static. insufficient data exists to fully understand groundwater at the Site.	Groundwater data for the waste unit monitoring networks indicate static conditions for non-impacted, downgradient wells, indicating that landfill leachate is not being released or impacting groundwater. Data from wells that were impacted prior to construction and closure of the waste management units have exhibited decreasing trends for constituents of concern, generally indicating attenuation of residual contamination at the site.



ARC023	Sec VI	39, ¶1	Northwest Aluminum Company (NAC) successor to <i>Northwest Aluminum Specialties, Inc.,</i>	Northwest Aluminum Company (NAC) successor to <i>Northwest Aluminum Company (NWA),</i>
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